intention, therefore, for the invention to be limited only as indicated by the scope of the following claims.

What is claimed:

1. In a cable communications system between a first location and a second location, the first location comprising an input and output to the cable communications system, the communications system comprised of two segments of RF bandwidth, a first segment of the RF bandwidth comprising a forward bandwidth capable of carrying one or more discrete RF channels from the cable system headend, through the cable network and from the second location to the first location, and a second segment of the RF bandwidth comprising a reverse bandwidth and capable of carrying one or more discrete RF channels from the first location to the second location and through the cable network to the cable system headend, the second location comprising an amplifier for the forward bandwidth and an amplifier for the reverse bandwidth, and a communication path from the first location to the second location partitioned into two parts, a first part starting at the first location and running to an intermediate location between the first location and the second location, the first part of the communications path being susceptible to noise signals entering the communications path both within and outside of the RF communications channels carried within the reverse bandwidth, and a second part of the communications path starting at the intermediate location and running to the second location, the second part of the communications path being more immune to noise signals entering the communications path both within and outside of the RF communications channels carried within the reverse bandwidth, a method of controlling and minimizing the amplitude of noise signals from passing from the first part of the communications path to the second part of the communications path comprising the steps of:

   collecting all RF signals input into the first part of the communications path at the first location before noise signals are combined with the input signals;

   amplifying all of the RF signals input into the first part of the communications path at the first location by an amount G;

   transmitting the amplified input signal through the first part of the communications path; and

   at a fourth location located in the second part of the communications path between the intermediate location and the second location, attenuating the amplified signals in the reverse bandwidth only to the degree necessary as not to cause the reverse amplifier located at the second location to go either into compression or overload.

2. A method as claimed in claim 1 where noise signal includes but is not limited to kT noise, impulse noise, ingress noise and any other external RF signals that are not part of a RF communications channels input at location 1.

3. A method as claimed in claim 1 wherein a communications channel a(f,t) is input at location 1.

4. A method as claimed in claim 2 wherein the amplitude of the input communications channel a(f,t) can be varied either manually or automatically via communications with the cable system headend.

5. A method as claimed in claims 3 and 4 wherein when the amplitude of the input communications channel is set to its maximum value, $a(f,t)_{MAX}$, the attenuation, A, which occurs at the fourth location within the second part of the communications path between the intermediate location and the second location, is set to a value such that the amplified signal when attenuated to $Ga(f,t)_{MAX}/A$ in the reverse bandwidth does not cause the reverse amplifier located at the second location to go either into compression or overload.

6. In a cable communications system between a multiplicity of locations and a second location, the multiplicity of locations comprising multiple inputs and outputs to the cable communications system, the communications system comprised of two segments of RF bandwidth, a first segment of the RF bandwidth comprising a forward bandwidth and capable of carrying one or more discrete RF channels from the cable system headend, through the cable network and from the second location to the multiplicity of locations, and a second segment of the RF bandwidth comprising a reverse bandwidth and capable of carrying one or more discrete RF channels from the multiplicity of locations to the second location and through the cable network to the cable system headend, the second location comprising an amplifier for the forward bandwidth and an amplifier for the reverse bandwidth, and a multiplicity of communication paths from each of the multiplicity of locations to the second location partitioned into two parts, a first part of each individual path starting at each of the multiplicity of locations and running to each of some multiplicity of intermediate locations between each of the multiplicity of locations and the second location, the first part of each of the multiple communications paths being susceptible to noise signals entering the communications path both within and outside of the RF communications channels carried within the reverse bandwidth, and a second part of the communications path starting at each of the multiplicity of intermediate locations and running to the second location, the second part of the multiple communications paths being more immune to noise signals entering the communications path both within and outside of the RF communications channels carried within the reverse bandwidth, a method of controlling and minimizing the amplitude of noise signals from passing from each of the multiple first parts of the communications path to each of the multiple second parts of the communications path comprising the steps of:

    collecting all RF signals input into each of the multiple first parts of the communications paths at the multiplicity of locations before noise signals are combined with the multiple input signals;

amplifying each of the multiple RF signals input into the first part of the communications path at each of the multiple locations by an amount G;

transmitting each of the multiple amplified input signals through each of the multiple first parts of the communications paths; and

at each of some multiple locations within each of the multiple second parts of the communications paths between the multiple intermediate locations and the second location, attenuating each of the multiple amplified signals in the reverse bandwidth only to the degree necessary as not to cause the reverse amplifier located at the second location to go into either compression or overload.

7. A method as claimed in claim 6 wherein each of multiple communications channels $a_1(f,t)$ through $a_N(f,t)$ are each input at each of a multiplicity of locations.

8. A method as claimed in claim 7 wherein the amplitude of each of the multiple input communications channels $a_1(f,t)$ through $a_N(f,t)$ can each be varied either manually or automatically via communications with the cable system headend.

9. A method as claimed in claims 7 and 8 wherein when the amplitude of each of the multiple input communications channels are set to their individual maximum values, $a_1(f,t)_{MAX}$ through $a_N(f,t)_{MAX}$, the attenuation, A_1 through A_N, which occurs at each of the multiplicity of locations, within the multiple second parts of the communications paths between the multiple intermediate locations and the second location, is set to a value such that the each of multiple amplified signals when attenuated to $Ga_K(f,t)_{MAX}/A_K$ and the sum of each of the multiple amplified signals when attenuated SUM $(Ga_K(f,t)_{MAX}/A_K)$ in the reverse bandwidth does not cause the reverse amplifier located at the second location to go either into compression or overload.

10. The method as described in claim 9 whereby the attenuation A_K for each reverse path 1 through N is optimized for each of the individual, amplified, maximum input information signals $Ga_1(f,t)_{MAX}$ through $Ga_N(f,t)_{MAX}$.

11. The method as described in claim 10 whereby each of the attenuated input information signals $(Ga_k(f,t)_{MAX}/A_K)$ hit the first return amplifier at the second location at ± 3 dB of the optimum return path signal for the amplifier.

12. The method as described in claim 10 whereby when there are two or more signals $a_1(f,t)$ and $a_K(f,t)$ input onto the same portion of the first part of the communication path and each signal is each amplified to $Ga_1(f,t)$ and $Ga_K(f,t)$, such that the amplified signals share the same means of attenuating the combined signals, A_I, the maximum attenuation value will be defined by the larger of the amplified return signals such that the attenuation is large enough not to cause the reverse amplifier located at the second location to go into either compression or overload.

13. In a cable communications system between a first location and a second location, the first location comprising an input and output to the cable communications system, the communications system comprised of two segments of RF bandwidth, a first segment of the RF bandwidth comprising a forward bandwidth capable of carrying one or more discrete RF channels from the cable system headend, through the cable network and from the second location to the first location, and a second segment of the RF bandwidth comprising a reverse bandwidth and capable of carrying one or more discrete RF channels from the first location to the second location and through the cable network to the cable system headend, the second location comprising an amplifier for the forward bandwidth and an amplifier for the reverse bandwidth, and a communication path from the first location to the second location partitioned into two parts, a first part starting at the first location and running to an intermediate location between the first location and the second location, the first part of the communications path being susceptible to noise signals entering the communications path both within and outside of the RF communications channels carried within the reverse bandwidth, and a second part of the communications path starting at the intermediate location and running to the second location, the second part of the communications path being more immune to noise signals entering the communications path both within and outside of the RF communications channels carried within the reverse bandwidth, a means of controlling and minimizing the amplitude of noise signals from passing from the first part of the communications path to the second part of the communications:

    means of collecting all RF signals input into the first part of the communications path at the first location before noise and interfering signals are combined with the input signals;

    means of amplifying all of the RF signals input into the first part of the communications path at the first location by an amount G and transmitting the amplified input signal through the first part of the communications path; and

    means at a fourth location within the second part of the communications path between the intermediate location and the second location, attenuating the amplified signals in the reverse bandwidth only to the degree necessary as not to cause the reverse amplifier located at the second location to go either into compression or overload.

14. The system as claimed in claim 13 wherein the means of amplifying the input signals are part of the input device.

15. The system as claimed in claim 14 wherein the RF output of the input device is greater than 60 dBmV.

16. The system as claimed in claim 13 wherein the means of attenuating the return signal is part of a stand alone device mounted at or near the demarcation point at the customer premise.

17. The system as claimed in claim 13 wherein the means of attenuating the return signal is a fixed attenuator of a specific value.

18. The system as claimed in claim 13 wherein the means of attenuating the return signal is a variable attenuator over a specific range.

19. The system as claimed in claim 13 wherein the means of attenuating the return signal is a combination of a fixed and variable attenuator over a specific range.

20. The system as claimed in claim 13 wherein the means of attenuating the return signal is part of the cable network directional couplers and provide attenuation in the reverse bandwidth which is different than the coupling loss in the forward bandwidth.

21. The system as claimed in claim 13 wherein the means of attenuating the return signal is part of a stand alone device which is part of the return path of the overall cable plant and in which multiple devices provide additive and distributed attenuation in the reverse direction from the last directional coupler to the return amplifier at second location.

22. In a cable communications system between a first location and a second location, the first location comprising an input and output to the cable communications system, the communications system comprised of two segments of RF bandwidth, a first segment of the RF bandwidth comprising a forward bandwidth capable of carrying one or more discrete RF channels from the cable system headend, through the cable network and from the second location to the first location, and a second segment of the RF bandwidth comprising a reverse bandwidth and capable of carrying one or more discrete RF channels from the first location to the second location and through the cable network to the cable system headend, the second location comprising an amplifier for the forward bandwidth and an amplifier for the reverse bandwidth, and a communication path from the first location to the second location partitioned into two parts, a first part starting at the first location and running to an intermediate location between the first location and the second location, the first part of the communications path being susceptible to noise signals entering the communications path both within and outside of the RF communications channels carried within the reverse bandwidth, and a second part of the communications path starting at the intermediate location and running to the second location, the second part of the communications path being more immune to noise signals entering the communications path both within and outside of the RF communications channels carried within the reverse bandwidth, a method of controlling and minimizing the amplitude of noise signals from passing from the first part of the communications path to the second part of the communications path comprising the steps of:

collecting all RF signals input into the first part of the communications path at the first location before noise and interfering signals are combined with the input signals;

shifting all of the RF Input signals in a block to another portion of the RF spectrum, typically above the forward RF bandwidth, which is more immune to noise and interfering signals;

transmitting the frequency shifted input signals through the first part of the communications path;

at a fourth location within the second part of the communications path between the intermediate location and the second location, block downconverting the input signals to the normal reverse bandwidth; and

attenuating or amplifying the signals that are output from the downshifted frequency band such that these signals reach the second location at the optimum amplitude for transmission by the reverse amplifier and do not cause the reverse amplifier located at the second location to go into either compression or overload.